



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|-------------------------|---------------------|------------------|
| 10/630,449 | 07/29/2003 | George Stephen Mecherle | 7242-109D1 | 7785 |

167 7590 12/03/2004

FULBRIGHT AND JAWORSKI L L P
PATENT DOCKETING 29TH FLOOR
865 SOUTH FIGUEROA STREET
LOS ANGELES, CA 900172576

EXAMINER

SINGH, DALZID E

ART UNIT PAPER NUMBER

2633

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/630,449

Applicant(s)

MECHERLE ET AL.

Examiner

Dalzid Singh

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-9, 13-24, 26-40, 44-51 and 53-55 is/are rejected.
- 7) ☒ Claim(s) 4, 10-12, 25, 41-43 and 52 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 29 July 2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of restriction requirement in the reply filed on 19 July 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Drawings

2. The drawings are objected to because the structural elements of figure 2 (52, 54, 56, 60, 65 and 69), figure 3 (50, 55, 62 and 70) and figure 4 (100, 110, 130-132, 134-136, 140, 142-44, 146 and 120) are merely labeled with identifying numbers. Applicant must supply a suitable legend. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application (see 37 CFR 1.84(n) and 1.84(o)).

The following are quotations of 37 CFR 1.84(n) and 1.84(o):

(n) *Symbols*. Graphical drawing symbols may be used for conventional elements when appropriate. The elements for which such symbols and labeled representations are used must be adequately identified in the specification. Known devices should be illustrated by symbols which have a universally recognized conventional meaning and are generally accepted in the art. **Other symbols which are not universally recognized may be used, subject to approval by the Office, if they are not likely to be confused with existing conventional symbols, and if they are readily identifiable.**

(o) *Legends*. Suitable descriptive legends may be used subject to approval by the Office, or may be required by the examiner where necessary for understanding of the drawing. They should contain as few words as possible.

The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 38 is objected to because of the following informalities: Claim 38 is depending on a cancelled claim 56. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 5-9, 14, 15, 34-36, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878).

Regarding claim 1, Britz et al discloses free-space communication system, comprising:

a splitter in communication with the input to split the digital signal into a plurality of approximately equal laser data signals (as shown in Fig. 5, the serial to parallel converter (154) split the input signal into a plurality of equal laser data signals, transmitted to laser transmitter (166));

a plurality of lasers (166) displaced from one another and facing in parallel directions, each of the lasers being in communication with the splitter (the lasers are in communication with the splitter);

Although Britz et al do not specifically disclose a plurality of laser drivers, however, it would have been obvious that there exist plurality of laser drivers to drive the laser transmitter (166).

Furthermore, Britz et al disclose free-communication system as discussed above and differ from the claimed invention in that Britz et al do not specifically discloses an input signal interface for receiving a digital signal. As shown in Fig. 1, Britz et al show plurality of devices communicating with each other. Therefore, it would have been obvious that there exist input signal interface for each device. One of ordinary skill in the art would have been motivated to provide such interface in order to convert the signal to a proper format and enable communication between other devices.

Regarding claim 2, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the input signal is characterized by a data rate of at least 10 Mbits/second, and each laser is supplied with a nominal current of at least 100 mA. However, it would have been a matter of design choice to operate the system of Britz et al with such data rates and current values.

Regarding claim 5, Britz et al shows that each of the plurality of lasers includes a laser diode (166) comprising of laser driver as discussed above, and differ from the claimed invention in that Britz et al does not specifically disclose that the laser driver is receiving amplified data signals. However, it would have been obvious to provide amplifier to amplify the data signal in order to increase signal strength.

Regarding claim 6, as shown in Fig. 4, Britz et al shows that the each of the plurality of lasers further includes a lens for receiving and collimating the laser diode

output into an optical beam (Fig. 3 shows telescope, which include lens to transmit the optical signal).

Regarding claim 7, Britz et al differ from the claimed invention in that Britz et al does not specifically disclose that the beamwidth of the optical beam is adjustable. However, it would have been obvious that the optical beam is adjustable. In the event that the system is misaligned, one of ordinary skill in the art would have been motivated to adjust the optical beam in order to re-aligned or re-focus the optical beam onto the receiving unit.

Regarding claims 8 and 9, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the beamwidth of the optical beam is adjustable between from 0.3 mrad to approximately 3.5 mrad. However, it would have been a matter of design choice to adjust the beamwidth to such values in order to focus the light beam onto the receiver system.

Regarding claims 14 and 45, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the laser driver operates at a current of between approximately 100 milliAmperes and 1500 milliAmperes. However, it would have been a matter of design choice to operate the laser diode at such current level.

Regarding claims 15 and 46, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the laser diode generates an average power of at least 80 milliwatts. However, it would have been a matter of design choice to operate the laser diode at such power level.

Regarding claims 34 and 35, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the transceiver further comprises a protective enclosure. However, it would have been obvious that the transceiver comprise of protective enclosure in order to protect against natural phenomena, such as rain or temperature fluctuations.

Regarding claim 36, as shown in Fig. 5, Britz et al show a multiplexer (156) to combine multiple signal inputs and a de-multiplexer (154) to separate multiple signal outputs.

6. Claims 3, 13, 16-24, 26-33, 37, 39-51, and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Carlson et al (US Patent No. 6,285,476).

Regarding claim 3, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that signal regenerator in communication with the one or more digital input signals. However, providing signal regenerator in optical communication is well known. Carlson et al is cited to show such well known concept. In Fig. 6, Carlson et al show signal regenerator, such as (recover clock; retime data). Therefore it would have been obvious to an artisan of ordinary skill in the art to provide the system of Britz et al with signal regenerator as taught by Carson et al. One of ordinary skill in the art would have been motivated to do this in order to recover the data signal.

Regarding claims 13 and 44, Britz et al differ from these claims in that Britz et al do not specifically disclose a thermoelectric cooler in thermal communication with the laser diode. However, in high power laser used in free-space communication system it is well known to provide a thermoelectric cooler. Carlson et al is cited to show such well known concept. In col. 4, lines 40-44, Carlson et al teach the use of thermoelectric coolers. Therefore, it would have been obvious to an artisan of ordinary skill in the art to provide thermoelectric coolers to the laser of Britz et al. One of ordinary skill in the art would have been motivated to do such in order to cool the temperature of the laser in order to operate within a desired range.

Regarding claims 16-18 and 47-49, Britz et al differ from these claims in that Britz et al do not specifically disclose the digital signal comprises packet-based communication signal in accordance with a data transmission protocol such protocol selected from the group consisting of TCP/IP, IPX, Fast Ethernet, SONET, and ATM. However, since Britz et al disclose communication system, it would have been obvious to communicate packet-based communication with such protocol. Carlson et al is cited to show that free-space communication is able to communicate packet-based signal with such protocol. In col. 8, lines 17-25, Carlson et al teach communication with such protocols. Therefore, it would have been obvious to an artisan of ordinary skill in the art to communicate with such protocols. One of ordinary skill in the art would have been motivated to do such in order to communicate with various networks system.

Regarding claims 19 and 50, in Figs. 3 and 4 Britz et al show various lenses, in Fig. 2, Britz et al show photodiodes (68 and 69). Britz et al differ from the claimed

Art Unit: 2633

invention in that Britz et al do not specifically disclose that the lenses has aperture and reflectors. However, since the lenses are used in free-space communication system therefore it would have been obvious that the lenses consist of aperture and reflectors. Carlson et al is cited to show such well known concept. As shown in Figs. 3 and 4, Carlson et al show aperture and reflectors. Therefore, it would have been obvious to an artisan of ordinary skill in the art to provide such lenses. One of ordinary skill in the art would have been motivated to do such in order to focus the optical beam and transmit the beam to long distances.

Regarding claims 20 and 55, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the reflector has an f-number of about 0.67. However, it would have been a matter of design choice to provide the reflector with f-number of about 0.67.

Regarding claim 21, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the reflector is a Mangin mirror. However, reflector such as Mangin mirror is well known. Therefore, it would have been a matter of design choice to provide the reflector as a Mangin mirror.

Regarding claims 22 and 51, in view of the above, as shown in Figs. 3 and 4, Carlson et al show that the reflector is a mirror having a general conic, aspheric, or parabolic optical surface that is coupled with one or more corrector lenses.

Regarding claim 23, in view of the above, Carlson et al further disclose light baffle (see col. 2, lines 9-10, col. 5, lines 21-22 and Fig. 2).

Regarding claim 24, as shown in Fig. 3, Britz et al shows a preamplifier (20) coupled with the photodiode (18); an output signal regenerator (22) coupled with the preamplifier (20); and an output signal interface (30) coupled with the output signal regenerator.

Regarding claim 26, as shown in Fig. 2, Carlson et al shows a background rejection filter (210) near the focal point of the reflector.

Regarding claim 27, the combination of Britz et al and Carlson et al differs from the claimed invention in that the combination does not specifically disclose that the background rejection filter is a bandpass filter. However, it would have been a matter of design choice to provide a bandpass filter in order to reject a certain type of noise.

Regarding claims 28, 29, 53 and 54, in col. 5, lines 60-62, Carlson et al further disclose that the background rejection filter is an optical interference filter and has a nominal center wavelength of approximately 1550 nanometers.

Regarding claim 30, as shown in col. 2, lines 30-36, Britz et al disclose communication through radio frequency link.

Regarding claim 31, the combination of Britz et al and Carlson et al differs from the claimed invention in that the combination does not specifically disclose monitoring circuitry for monitoring signal strength or transceiver status. However, in col. 5, lines 1-30, Britz et al disclose routing between various transceivers. Therefore, there must be a monitoring circuit to monitor status of the transceiver.

Regarding claims 32 and 33, the combination does not disclose that the backup transceiver is activated upon detecting impairment of the laser transceiver, and the

backup transceiver is deactivated upon detecting non-impairment of the laser transceiver. However, it would have been obvious to activate the backup receiver upon detecting impairment.

Regarding claim 37, Britz et al discloses free-space communication system, comprising:

a splitter coupled with the regenerator to split the digital signal into one or more laser data signals (as shown in Fig. 5, the serial to parallel converter (154) split the input signal into p a plurality of equal laser data signals, transmitted to laser transmitter (166)); and,

a plurality of lasers (166) coupled with the laser driver to receive the laser data signals, the lasers being laterally displaced from one another and facing in parallel directions.

Although Britz et al do not specifically disclose a plurality of laser drivers, however, it would have been obvious that there exist plurality of laser drivers to drive the laser transmitter (166).

Britz et al disclose free-communication system as discussed above and differ from the claimed invention in that Britz et al do not specifically discloses an input signal interface for receiving a digital signal. As shown in Fig. 1, Britz et al show plurality of devices communicating with each other. Therefore, it would have been obvious that there exist input signal interface for each device. One of ordinary skill in the art would have been motivated to provide such interface in order to convert the signal to a proper format and enable communication between other devices.

Furthermore, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that signal regenerator in communication with the one or more digital input signals. However, providing signal regenerator in optical communication is well known. Carlson et al is cited to show such well known concept. In Fig. 6, Carlson et al show signal regenerator, such as (recover clock; retiming data). Therefore it would have been obvious to an artisan of ordinary skill in the art to provide the system of Britz et al with signal regenerator as taught by Carlson et al. One of ordinary skill in the art would have been motivated to do this in order to recover the data signal.

Regarding claim 39, in Fig. 5, as discussed above, the combination of Britz et al and Carlson et al disclose plurality of lasers (166) includes a laser diode coupled to the laser driver and receiving the conditioned laser data signals.

Regarding claim 40, as shown in Figs. 3 and 4, the combination of Britz et al and Carlson et al shows that each of the plurality of lasers further includes a lens for receiving and collimating the laser diode output into an optical beam. The combination differs from the claimed invention in that Britz et al do not specifically disclose that the beamwidth of the optical beam is adjustable between to approximately 3.5 mrad or less. However, it would have been a matter of design choice to adjust the beamwidth to such values in order to focus the light beam onto the receiver system.

Allowable Subject Matter

7. Claims 4, 10-12, 25, 41-43 and 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sidorovich et al (US Patent No. 6,795,655) is cited to show free-space optical communication system with spatial multiplexing.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272--3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS
November 26, 2004

Haulyphan
Hauly Phan
Primary Examiner
11/26/04.